

Message

From: Nishida, Jane [Nishida.Jane@epa.gov]
Sent: 2/4/2020 2:51:15 PM
To: Bawa Meera VANM [Meera.Bawa@teck.com]; Schmit, Ayn [Schmit.Ayn@epa.gov]; Sopkin, Gregory [sopkin.gregory@epa.gov]
CC: Kaleb D. Froehlich [KDFroehlich@hollandhart.com]; Hall Trevor SPOK [Trevor.Hall@teck.com]
Subject: RE: SRFs - additional presentation

Dear Meera,

Thank you for meeting with EPA last week and sharing the presentation on the Saturated Rock Fill (SRF) technology. We appreciated the time and efforts that you took to meet with us and discuss the implementation of Teck's Elk Valley Water Quality Plan, including the SRF. Our technical experts in the region and headquarters offices will review this information and may have additional questions later.

Thanks again and we look forward to continued discussions and sharing of information with your team.

Best regards,

Jane

*Jane Nishida
Principal Deputy Assistant Administrator
Office of International and Tribal Affairs
U.S. Environmental Protection Agency
Tel: 202-564-1531*

From: Bawa Meera VANM <Meera.Bawa@teck.com>
Sent: Monday, February 03, 2020 1:47 PM
To: Schmit, Ayn <Schmit.Ayn@epa.gov>; Nishida, Jane <Nishida.Jane@epa.gov>
Cc: Kaleb D. Froehlich <KDFroehlich@hollandhart.com>; Hall Trevor SPOK <Trevor.Hall@teck.com>
Subject: FW: SRFs - additional presentation

Dear Jane and Ayn,

Thank you again for making time to meet with us last week. I appreciated the opportunity to discuss implementation of the Elk Valley Water Quality Plan. During our conversation, I referred to a presentation delivered by the Saturated Rock Fill (SRF) team at a recent conference. The email below includes a link to that presentation together with information on the conference as well. I have also included an email from December 4th with links to videos on the SRFs. I would much appreciate if you could share this with others that participated on the call; I neglected to gather everyone's contact information.

As noted during our meeting, we welcome tours to view and to better understand the Active Water Treatment Facility and the SRFs. It has been great to have already had the opportunity to tour Ayn, Jason, and Patty and to explain the technology to them. I would be pleased to arrange this for whenever might be best for EPA calendars.

I look forward to continued correspondence on this and continuing the great work initiated by Ayn, the BC Ministry of Environment and Climate Change, and others to achieve comprehensive transboundary monitoring of the reservoir, sharing of data, public access to monitoring results, and ongoing opportunities for discussions between monitoring teams located on both sides of the border.

With my best,

Meera

Meera Bawa
Manager, Regulatory Affairs
Teck Resources Limited
Direct Phone: +1.604.699.5016
Phone: +1.604.699.4000
eMail: Meera.Bawa@teck.com
www.teck.com

Begin forwarded message:

From: "Gildea, Jason" <Gildea.Jason@epa.gov>

Date: December 19, 2019 at 5:04:22 PM EST

Subject: RE: SRFs - additional presentation

[External email]

Thanks Meera!

Jason

From: Bawa Meera VANM <Meera.Bawa@teck.com>

Sent: Thursday, December 19, 2019 11:04 AM

To: Gildea, Jason <Gildea.Jason@epa.gov>

Cc: Schmit, Ayn <Schmit.Ayn@epa.gov>; McGrath, Patricia <m McGrath.patricia@epa.gov>; Hill, Douglas J ENV:EX <Doug.Hill@gov.bc.ca>; Naftz, David <dlnaftz@usgs.gov>; Fraser Carla SPO <Carla.Fraser@teck.com>; Steeves Dale VANM <Dale.Steeves@teck.com>; Milligan Nic SPO <Nic.Milligan@teck.com>; Myla Kelly <mkelly2@mt.gov>

Subject: RE: SRFs - additional presentation

Hi again Jason,

Further to the email below, I wanted to pass on this link <http://bc-mlard.ca/files/presentations/2019-23-KLEIN-ETAL-removing-selenium-nitrate-saturated-fill.pdf> to a presentation delivered just a few weeks ago at the MEND annual workshop (<http://bc-mlard.ca/about>). The presentation includes the story of the SRF as well as data on performance. Slide 22 includes the list of institutional members of the expert advisory group which includes Montana State University .

Internally we've also been discussing dates for a tour of Elk Valley mines given the interest and participation of MRC members in November. Looking ahead to 2020 and the MRC calendar, we are holding the dates of June 2, 4, 9, and/or 11, 2020 which we hope to confirm once the Chairs have finalized the date for the proposed meeting. If an

in-person meeting is not held we hope these dates, or alternates can be confirmed early in the new year to allow time for government approvals and other arrangements.

Once again, happy holidays and see you in 2020!

Meera

From: Bawa Meera VANM

Sent: Wednesday, December 04, 2019 1:52 PM

To: 'Gildea, Jason' <Gildea.Jason@epa.gov>

Cc: Schmit, Ayn <Schmit.Ayn@epa.gov>; McGrath, Patricia <mcgrath.patricia@epa.gov>; Hill, Douglas J ENV:EX <Doug.Hill@gov.bc.ca>; Naftz, David <dlnaftz@usgs.gov>; Fraser Carla SPO <Carla.Fraser@teck.com>

Subject: RE: SRFs

Hi Jason,

Thanks for this. It's great to know of the interest in the SRFs. As you note, the IPA does have some information. There is also information on SRFs available on our website, which admittedly is not always easy to locate.

This video explains the SRF and includes footage of the actual SRF:

<https://www.youtube.com/watch?v=6Dfd1QtO2Ng>

This second video provides an illustration of the process including water volume

treated: <https://www.youtube.com/watch?v=ER39Fs91yyM#action=share>

The below is a more technical explanation of the process together with the flowchart of the treatment:

Teck has been investigating saturated rock fills (SRF) as an alternative treatment option in the Elk Valley since 2012. The intent of the SRF is to create a microbial reducing environment which converts nitrate to N_2 and selenate (SeO_4) to selenite (SeO_3), similar to what occurs in the AWTF. To create a reducing environment, a carbon source is added to act as an electron donor. The nitrate and selenate are then used to support anaerobic respiration, instead of oxygen, and an electron is transferred from the carbon to the nitrate or selenate which produces reduced forms.

The treatment process involves submerging waste rock with water in a mined out pit. Water and carbon are injected to the pit and a hydraulic gradient within the waste rock is created from the injection location to the pumping wells. At the exit location, water is pumped out of the SRF to a buffer pond before it is discharged to the environment. An overview of the treatment train is in Figure 3.

In 2016, Teck initiated a pilot SRF test at 500 m³/d at the Elkview mine F2 pit. The pilot test was successful and Teck initiated a full-scale SRF trial in 2016 which has been operational since January 2018. Water is injected into the pit at up to 10,000 m³/d and methanol is added as a carbon source. Water is pumped out of the SRF at the same rate. Monitoring over the past 21 months has showed greater than 95% removal of nitrate and selenium.

I hope this satiates the interests in SRFs.

Happy Holidays to you all if we don't speak before then!

Meera

From: Gildea, Jason <Gildea.Jason@epa.gov>
Sent: Wednesday, December 04, 2019 9:25 AM
To: Bawa Meera VANM <Meera.Bawa@teck.com>; Fraser Carla SPO
<Carla.Fraser@teck.com>
Cc: Schmit, Ayn <Schmit.Ayn@epa.gov>; McGrath, Patricia
<mcgrath.patricia@epa.gov>; Hill, Douglas J ENV:EX <Doug.Hill@gov.bc.ca>; Naftz,
David <dlnaftz@usgs.gov>
Subject: SRFs

[External email]

Hi Meera and Carla,

We've received a number of questions about the current and proposed SRFs for the Elk River valley. Do you have a paper or presentation that you can share that provides more detail? I.e., describes the chemistry, proposed processes, tests results, etc.? I realize that some of this is in the 2019 IPA, Annex J, but we would like to see a more detailed report, if possible.

Thanks!
Jason

Jason Gildea
Hydrologist, EPA Region 8
10 West 15th Street, Suite 3200
Helena, MT 59626
(406)457-5028
Gildea.Jason@epa.gov